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Political Aspects of Household Debt

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Keywords: Consumer debt; employment rent; cost of job loss; bargaining power; income distribution; growth; stability.

JEL Codes: E12; E21; E24; E44; O41.

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Yun K. Kim†, Gilberto Tadeu Lima‡, and Mark Setterfield§

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1 Introduction

From the 1980s until the onset of the Great Recession, the US economy was characterized by simultaneous increases in household indebtedness, income inequality, and consumption expenditures. The income share of the top 1 percent of the income distribution rose from approximately 8 percent in 1980 to almost 18 percent by 2007. Meanwhile, the ratio of personal outlays to disposable personal income increased from about 88 percent in the early 1980s to nearly 100 percent in 2007. Finally, household debt as a share of GDP increased from about 58 percent in 1975 to nearly 129 percent in 2007. A prominent argument in the literature has been that these trends were closely linked. Specifically, rising income inequality coupled with a desire on the part of households to maintain their relative standards of living is thought to have been one of the main drivers of increased borrowing and debt accumulation by less affluent (working) households (Palley, 2002; Barba and Pivetti, 2009; Kumhof et al., 2015; Foster and Magdoff, 2009; Carr and Jayadev, 2015).

This paper explores a different dimension of the inequality/indebtedness nexus. In his seminal article "Political Aspects of Full Employment", Kalecki (1943) postulated that unemployment plays an important role as a disciplinary device in a capitalist labor market. We argue that household debt can play a similar role. This is because like unemployment in Kalecki (1943), debt can act as a worker discipline device by raising the threat to their well-being that workers associate with job loss. This, in turn, reduces workers' willingness to (*inter alia*) bargain for higher wages. Our argument is grounded in a number of recent observations to the effect that rising household indebtedness disempowers workers and affects the wage bargain.[1] According to Bonefeld (1995, p.69), debt undermines workers' resistance to wage reductions and the intensification of work, playing a critical role in "disciplining social relations to monetary scarcity and a life of hard and unrewarding labor to sustain basic needs". Similarly, Bryan et al. (2009, p.13) posit that "while the wage relation involves a

[1]These observations dovetail with more general empirical findings that "financialization" has been a source of increased income inequality (Köhler et al., 2015; Darcillon, 2016).

retrospective payment to labor for past surplus value, consumer credit as labor's relation with capital about the future, implies the rending of surplus value before participation in "production" and so intensifies labor's commitment to the production system itself". Citing Glyn (2006), meanwhile, Slater and Spencer (2014, p.142) argue that "financialization has impacted directly on the employment relationship. Specifically, it has enabled employers to increase their power over workers. As workers have accumulated financial assets and taken on greater amounts of debt, they have become less able and willing to push for higher wages and better working conditions ... Higher personal debt ratios increase the vulnerability of those in work and the desperation of those without." These claims are echoed in the findings of, for example, Karacimen (2015), whose questionnaires and interviews with workers in the Turkish metal working sector reveal that indebtedness transforms capital-labor relations, ultimately increasing workers' sense of commitment to their employers. In a similar fashion Butrica and Karamcheva (2014) find that older adults with debt are 8 percentage points more likely to work and 2 percentage points less likely to receive Social Security benefits than those without debt, suggesting that, on balance, indebtedness compels older individuals to keep working.

Building on Setterfield and Kim (2016) and Setterfield et al. (2016), in which rising inequality in the presence of consumption emulation effects is linked to increasing indebtedness, we postulate that, simultaneously, debt is an important potential cause of rising income inequality. Using an employment rent framework (Bowles, 1985, 2004; Schor and Bowles, 1987), we show how the rent workers associate with their current employment is affected by their level of indebtedness. The possibility arises that as debt increases, so, too, does the cost of job loss, reducing the willingness of workers to risk job loss in the process of negotiating for higher wages. The diminution of workers' power in the wage bargain thus causes slower wage growth for working households, and so contributes to rising income inequality.[2] This, in

[2]Note that, together with their *ability* to bargain (as reflected in, for example, the structure of labor law), we hereby treat the *willingness* of workers to bargain as one dimension of workers' bargaining power. In what follows we refer to changes in the employment rent as affecting workers' bargaining power on the understanding that it does so by affecting the willingness of workers to bargain, as described above.

turn, may induce additional borrowing by working households, so that what ultimately arises is a two-way interaction between inequality and indebtedness in the form of a vicious circle. We believe that this self-reinforcing cycle of inequality, indebtedness, and disempowerment has contributed to the economic and political unsustainablity of the Neoliberal (1980–2007) growth regime in the US economy. We show, however, that once we allow for bi-directional causality in the relationship between household debt and income inequality, the relationship between these variables (and its broader impact on a growing economy) is far from simple. Much depends on workers' borrowing behavior, and whether such behavior is principally motivated by a target level of consumption or a target level of debt (and in either case, to what extent). Ultimately, our analysis reveals that workers' borrowing behavior plays a decisive role in determining the stability properties of the economy.

Our paper is organized as follows. Sections 2 and 3 present the basic theoretical framework, which gives rise to a stock-flow consistent Post-Keynesian growth model in which inequality affects household indebtedness and *vice-versa*. Section 4 explores the dynamics and macroeconomic consequences of this two-way interaction between debt accumulation and income inequality. Finally, section 5 offers some concluding comments.

2 Accounting and Behavior in the Baseline Model

2.1 Social Accounting Matrices

We begin with a basic accounting framework that draws on Lavoie and Godley (2001-02) and Godley and Lavoie (2007), and that distinguishes four types of agents: workers, capitalists, banks, and non-financial firms. To focus our discussion, we assume a closed economy with no government sector.

Table 1 is the balance sheet matrix for our model economy. It shows the asset and liability allocations across the four types of agent. There are four classes of assets: physical capital (K), equity (Q), net loans to working households and the corresponding net bank deposits

of capitalists (D_W).[3] A column sum for a class of agent produces its net worth, while a row sum (across workers, capitalists, banks, and firms) produces the net value of a class of assets.

Associated with this balance sheet matrix is the transaction flow matrix in table 2. Household real wage income (WL), where W is the real wage and L is the level of employment, can be supplemented by new borrowing ($\dot{D}_W$) to finance the sum of workers' consumption (C_W) plus the interest accruing on their past borrowing (iD_W, where the interest rate, i is assumed fixed for simplicity).[4] Capitalists earn income on their net deposits (iD_W) and from profits (Π), which they use for consumption (C_R), to make new deposits ($\dot{D}_W$), or to purchase equities ($\dot{Q}$). In the case of firms, we distinguish between capital and current transactions. Firms finance investment (I) with new funds provided by capitalists ($\dot{Q}$) and distribute all earnings to capitalists.[5] For the transaction matrix, we note that the sums across the rows must equal zero as a consistency condition.[6] The columns also sum to zero, reflecting agents' budget constraints.

Table 1: Balance Sheet Matrix

	Workers	Capitalists	Firms	Banks	Sum
Capital			K		K
Deposits		D_W		$-D_W$	0
Loans	$-D_W$			D_W	0
Equities		Q	$-Q$		0
Net worth	NW_W	NW_R	NW_F	NW_B	K

[3]We assume throughout that $D_W > 0$, thereby excluding the possibility that working households might act as net creditors. This is consistent with the stylized facts of household balance sheets in recent decades (Barba and Pivetti, 2009; Carr and Jayadev, 2015).

[4]Note that implicit in this statement of workers' budget constraint are the assumptions that workers do not save, and that workers' debts are not amortized but instead roll over from period to period. In other words, debt servicing consists only of meeting interest payable on outstanding debt, so that as they continue to borrow, the total outstanding indebtedness of working households increases over time. Again, this is consistent with the stylized facts of household balance sheets in recent decades (Barba and Pivetti, 2009; Carr and Jayadev, 2015).

[5]For simplicity, the price of equity is fixed and normalized to one.

[6]This consistency condition reflects that one agent's expenditure must be equal to another agent's income in the economy as a whole.

Table 2: Transaction Flow Matrix

			Firms		Banks		
	Workers	Capitalists	Current	Capital	Current	Capital	Sum
Consumption	$-C_W$	$-C_R$	$C_W + C_R$				0
Investment			I	$-I$			0
Wages	WL		$-WL$				0
Firms' profits		Π	$-\Pi$				0
Deposit interest		iD_W			$-iD_W$		0
Loan interest	$-iD_W$				iD_W		0
Change in deposit		$-\dot{D}_W$				$\dot{D}_W$	0
Change in loans	$\dot{D}_W$					$-\dot{D}_W$	0
Issues of equities		$-\dot{Q}$		$\dot{Q}$			0
Sum	0	0	0	0	0	0	0

2.2 Banks and Firms

Our specification of the banking sector draws on Lavoie and Godley (2001-02) and Godley and Lavoie (2007), similarly distinguishing the capital and current accounts. We refer to financial intermediaries as "banks" and non-financial businesses as "firms". Consumer loans are intermediated by the banking sector. Banks are pure intermediaries that do not generate profits. As such, we do not distinguish between the borrowing rate and the lending rate, as (for instance) in Skott and Ryoo (2008a,b) and Isaac and Kim (2013). Capitalists hold saving deposits with banks, on which they receive interest payments. Workers receive these bank deposits as bank loans, with which they finance consumption expenditures.

Firms are characterized by their investment demand behavior and mark up pricing behavior. We treat the pricing behavior of firms in standard neo-Kaleckian fashion: price is a mark up over unit labor costs, reflecting an oligopolistic market structure (Harris, 1974; Asimakopulos, 1975; Dutt, 1984):

$$p = (1 + \tau)wL/Y \tag{1}$$

Here p is the price level, w is the nominal wage, τ is the mark up rate (which represents Kalecki's degree of monopoly), and L/Y is the labor-output ratio (i.e., the inverse of the

average product of labor). Such mark up pricing behavior implies a standard expression for the gross profit share ($\pi = \Pi/Y$):

$$\pi = \frac{\tau}{1+\tau} \tag{2}$$

Our exposition will treat τ and hence π as given in the short run. In the dynamics beyond the short run, however, τ and hence π become endogenous variables as a result of distributional conflict.

Let $r = \Pi/K$ denote the profit rate. Firms' desired investment rate ($g_K = I/K$) responds positively to the profit rate:

$$g_K = \kappa_0 + \kappa_r r \tag{3}$$

The parameters of equation (3) are positive: κ_0 captures the state of business confidence or animal spirits (Keynes, 1936); and κ_r captures the sensitivity of desired investment to the profit rate. The current profit rate approximates the expected rate of return, and hence induces planned investment (Robinson, 1962; Blecker, 2002; Stockhammer, 1999).[7]

Since the profit rate can be expressed in terms of the capacity utilization rate ($u = Y/K$) as:

$$r = \pi u \tag{4}$$

it follows that the expression for the accumulation rate in equation (3) can be re-written as:

$$g_K = \kappa_0 + \kappa_r \pi u \tag{5}$$

[7]Investment behavior is an important and contested subject in Post-Keynesian models. Since our focus is on workers' borrowing and associated consumption behavior, we use a simple neo-Keynesian investment function and leave extensions of our analysis that involve changing the form of the of the investment function to future research.

2.3 Workers' and Capitalists' Households

Workers' consumption behavior is given by:

$$C_W = WL - iD_W + \dot{D}_W \tag{6}$$

The term $WL - iD_W$ denotes after-interest-payments disposable income, while $\dot{D}_W$ captures borrowing by workers. Equation (6) is consistent with workers' budget constraint from the first column of Table 2, which requires that $\dot{D}_W = C_W + iD_W - WL$. Normalizing working households' consumption by the capital stock, and noting that $d_W = \frac{D_W}{K} \Rightarrow \dot{d}_W = \frac{\dot{D}_W}{K} - g_K d_W \Rightarrow \frac{\dot{D}_W}{K} = \dot{d}_W + g_K d_W$, we can re-write (6) as:

$$c_W = (1 - \pi)u - id_W + \dot{d}_W + g_K d_W \tag{7}$$

Workers' debt-financed consumption behavior plays a pivotal role in the analysis to follow. We use the following behavioral function to describe this behavior:

$$\dot{d}_W = f(d_W, \psi) \tag{8}$$

where $\psi = 1 - \pi$ denotes the wage share of income. Equation (8) suggests that workers' borrowing depends on their previously accumulated debt and their wage income. Note that equation (8) specifies workers' *normalized* borrowing behavior,[8] rather than their absolute level of borrowing ($\dot{D}_W$) in any period. Since $d_W = \frac{D_W}{K} \Rightarrow \dot{d}_W = \frac{\dot{D}_W}{K} - g_K d_W$ as previously noted, it follows that the level of workers' borrowing $\dot{D}_W = [\dot{d}_W + g_K d_W]K$ is an endogenous residual in our model, determined by equation (8) in conjunction with the rate of accumulation, g_K.

There are various combinations of economically reasonable behavior that might sign the partial derivatives of the function in equation (8), and so describe the precise manner in

[8] Normalized, as are the other variables in our model, by the capital stock.

which working households approach the process of debt accumulation. Hence if workers are mindful of the need to generate sufficient wage income to service outstanding debts, their borrowing may increase in the wage share ($f_\psi > 0$); however, workers might alternatively reduce borrowing as they receive higher wages ($f_\psi < 0$), if their borrowing is motivated principally by an exogenous target level of consumption (more of which can now be funded by current income). Workers' borrowing may increase in the level of indebtedness ($f_{d_W} > 0$), meanwhile, since more debt increases the debt-servicing burden and hence the need to borrow to achieve an exogenous target level of consumption. On the other hand, working households might behave more frugally, reducing their borrowing in response to an increase in their indebtedness ($f_{d_W} < 0$) if they are mindful of exceeding an exogenous target debt level. As this brief discussion reveals, the description of borrowing behavior in (8) ultimately allows for partial derivatives of differing signs depending on whether workers' borrowing behavior is principally driven by consumption considerations (such as an exogenous target level of consumption) or financial considerations (such as an exogenous target level of debt) (see, for example, Setterfield and Kim (2016) and Dutt (2005, 2006), respectively). Note also that the larger the magnitude of the partial derivatives of equation (8), the quicker will be the adjustment of workers' borrowing (and consumption) behavior to changes in their indebtedness and the wage share. As will become clear, the magnitudes (as well as the signs) of the partial derivatives of (8) play an important role in the economy's macrodynamics.

Capitalists' consumption, meanwhile, is a fixed proportion of their total (profit plus interest) income:

$$C_R = (1 - s_R)(\Pi + iD_W) \tag{9}$$

where s_R is capitalists' saving coefficient.[9] Normalizing capitalists' consumption equation

[9]Equivalently, capitalists' saving is given by $S_R = s_R(\Pi + iD_W)$. Recalling capitalists' budget constraint from the second column of table 2, equilibrium in the consumer credit market therefore requires that:

$$\dot{D}_W = s_R(\Pi + iD_W) - \dot{Q} \tag{10}$$

Note that this equality holds in equilibrium, when saving by capitalist households fully funds autonomous spending by workers as well as investment by firms. It does not imply that our model is subject to a

by the capital stock, we get:

$$c_R = (1 - s_R)(\pi + id_W) \tag{11}$$

2.4 Temporary Equilibrium

Commodity market equilibrium in our model has a standard representation:

$$Y = C_W + C_R + I \tag{12}$$

Normalizing (12) by the capital stock and substituting equations (5), (7), (8), and (11) into the resulting expression, we arrive at:

$$u = \psi u + f(d_W, \psi) + g_K d_W + (1 - s_R)(1 - \psi)u - s_R i d_W + \kappa_0 + \kappa_r(1 - \psi)u \tag{13}$$

Solving for u yields the following reduced-form expression for capacity utilization:

$$u = \frac{\kappa_0 + (\kappa_0 - s_R i)d_W + f(d_W, \psi)}{(s_R - \kappa_r - \kappa_r d_W)(1 - \psi)} \tag{14}$$

Substituting (14) into (4) and (5), meanwhile, yields accompanying reduced-form expressions for the rates of profit and accumulation:

$$r = \frac{\kappa_0 + (\kappa_0 - s_R i)d_W + f(d_W, \psi)}{(s_R - \kappa_r - \kappa_r d_W)} \tag{15}$$

$$g_K = \frac{\kappa_0 s_R - \kappa_r s_R i d_W + \kappa_r f(d_W, \psi)}{(s_R - \kappa_r - \kappa_r d_W)} \tag{16}$$

Clearly, the temporary equilibrium values of u, r, and g_K depend on both the wage share and the (normalized) indebtedness of working households. Workers' borrowing behavior therefore plays a crucial role in determining the relationship between effective demand and

savings-in-advance constraint, which would prevent it from being demand-led. In other words, some form of endogenous credit creation is required in order for the model to traverse from one steady state configuration to another. Since our interest is purely in the characteristics of the steady state itself, however, we abstract from this monetary feature of disequilibrium adjustment for the sake of simplicity.

income distribution. Hence note that:

$$\frac{\partial u}{\partial \psi} = \frac{\kappa_0 + (\kappa_0 - s_R)id_W + f(d_W, \psi) + (1-\psi)f_\psi}{(s_R - \kappa_r - \kappa_r d_W)(1-\psi)^2} \tag{17}$$

The standard "Keynesian stability condition" implies that $(s_R - \kappa_r - \kappa_r d_W) > 0$. It follows that if workers borrow more to finance consumption as wages rise ($f_\psi > 0$), the likelihood that $\frac{\partial u}{\partial \psi} > 0$ (i.e., demand is wage-led) increases. However, if workers reduce their debt-financed consumption as wages rise ($f_\psi < 0$) *and* do so aggressively, the derivative in (17) could become negative, resulting in a profit-led demand regime.[10]

Workers' borrowing behavior also dictates the relationship between the profit and accumulation rates and income distribution, determining whether (and the extent to which) growth is profit-led or wage-led. Hence:

$$\frac{\partial r}{\partial \psi} = \frac{f_\psi}{s_R - \kappa_r - \kappa_r d_W} \tag{18}$$

$$\frac{\partial g_K}{\partial \psi} = \frac{\kappa_r f_\psi}{s_R - \kappa_r - \kappa_r d_W} \tag{19}$$

If workers borrow more aggressively to maintain their consumption standards in the event of rising income inequality ($f_\psi < 0$), the rates of profit and growth will increase and we will observe profit-led growth. If, however, workers borrow more only when they feel they can afford to take on more debt by virtue of having higher wages ($f_\psi > 0$), the derivatives in (18) and (19) turn positive resulting in wage-led growth.[11]

Workers' borrowing behavior also plays an important role in determining the relationships between effective demand, profit, and growth rates on one hand, and the indebtedness of

[10]Note that the size of the wage share itself will also influence this possibility, and hence whether the demand regime is wage- or profit-led.

[11]Note that our results here are in line with previous studies that examine the implications of debt-financed consumption for wage-led vs. profit-led demand and growth regimes (Setterfield and Kim, 2017).

working households on the other. Hence:

$$\frac{\partial u}{\partial d_W} = \frac{(\kappa_0 + i(\kappa_r - s_R))s_R + \kappa_r f(d_W, \psi) + (s_R - \kappa_r - \kappa_r d_W) f_{d_W}}{(s_R - \kappa_r - \kappa_r d_W)^2 (1 - \psi)} \tag{20}$$

$$\frac{\partial r}{\partial d_W} = \frac{(\kappa_0 + i(\kappa_r - s_R))s_R + \kappa_r f(d_W, \psi) + (s_R - \kappa_r - \kappa_r d_W) f_{d_W}}{(s_R - \kappa_r - \kappa_r d_W)^2} \tag{21}$$

$$\frac{\partial g_K}{\partial d_W} = \frac{(\kappa_r(\kappa_0 + i(\kappa_r - s_R))s_R + \kappa_r f(d_W, \psi) + (s_R - \kappa_r - \kappa_r d_W) f_{d_W})}{(s_R - \kappa_r - \kappa_r d_W)^2} \tag{22}$$

If workers borrow more aggressively to maintain consumption when their indebtedness and hence the debt-servicing claims on their wage income increase ($f_{d_W} > 0$), the derivatives in (20) – (22) will be positive.[12] The economy will exhibit debt-led demand and growth regimes. However, if working households respond more frugally to their indebtedness ($f_{d_W} < 0$) *and* reduce their debt-financed consumption aggressively, the derivatives in (20) – (22) may turn negative and the economy will then exhibit debt-burdened demand and growth regimes.[13]

3 Extending the Model: Household Debt and the Cost of Job Loss

So far, we have considered only how the distribution of income affects household indebtedness. We now turn to the question of how household indebtedness affects income distribution. Our starting point is the employment rent framework of Bowles (1985, 2004) and Schor and Bowles (1987). This we write as:

$$E = W - \left(hW_u + \left[1 - h \right] W' \right) \tag{23}$$

[12] This is assured if $\kappa_0 > i(\kappa_r - s_R)s_R$, which is a reasonable condition since $0 < i, s_R < 1$.

[13] Note that the size of workers' debt burdens will also influence this possibility, and hence whether the demand and growth regimes are debt-led or debt-burdened.

where W is, as defined earlier, the real wage that a worker receives in their current employment, h is the probability that a displaced worker will be unemployed if he/she loses his/her current job, W_u is the income that a worker receives while unemployed (e.g., unemployment insurance benefits), and W' is the real wage that a worker will receive if they are re-employed upon loss of their current employment, where $W \geq W' > W_u$. We assume, for the sake of simplicity, that workers use current period values as an indication of expected future states and that h is exogenously given. Although h is the perceived probability of unemployment (rather than re-employment) in the event of job loss, we assume that no actual job loss takes place among currently employed workers. Instead, the probability of unemployment h is a credible threat to the status of currently employed workers as currently employed workers. We do not allow for actual transitions of currently employed workers into a state of unemployment so as to abstract from questions related to the capacity of formerly unemployed workers to continue servicing debts accrued while they were employed. As a result, any variations in the quantity of employment implied by local adjustments towards the steady state in the course of our stability analysis in section 4 are assumed to be achieved through variation in the hours worked by an otherwise fixed number of persons employed.[14]

In light of the aggregate level at which our model is developed, we need to redefine the employment rent in (23) so that it represents the value of remaining in employment to all currently employed workers. Multiplying by the level of employment, L, and noting that we also have $W' = W$ (since ours is a one sector growth model with homogeneous labor), the

[14]This is consistent with our treatment of h as exogenously given (and hence independent of local adjustments in u towards its steady state value). To see this, suppose we think of h as being proxied by the current rate of unemployment U, so that:

$$h = U = 1 - \frac{L}{N} = 1 - \frac{L}{Y}\frac{Y}{K}\frac{K}{N} = 1 - auk \tag{24}$$

where N is the labor force, a is the ratio of the total number of persons employed to total output, and k is the ratio of the capital stock to the labor force (not to be confused with the capital-labor ratio associated with the production technology on the supply side). Since by definition $\dot{k} = k(g_K - n)$, where n is the rate of growth of the labor force, we can treat k as constant ($\dot{k} = 0$) by postulating that $n = g_K$ – that is, the rate of growth of the labor force adjusts endogenously to meet the needs of a growing capitalist economy through inter-sectoral and/or inter-regional migration of a global "reserve army" of labor. With k thus fixed, any local variation in u implied by our stability analysis is absorbed in our model by local variation in a, leaving h unchanged.

employment rent expression in (23) becomes:

$$EL = WL - \left(hW_u L + \left[1 - h \right] WL \right) \tag{25}$$

Now consider how the value of this aggregate employment rent EL is modified by the fact that workers borrow to finance some part of their consumption spending and (as a consequence) carry debt that must be serviced from current income. We assume that workers can only borrow in this fashion if they are currently employed: in other words, *jobs effectively act as collateral for loans*. In this case, borrowing privileges are part of the benefit of employment, whereas loss of borrowing privileges is part of the cost of being unemployed.[15] In light of these considerations, the value of EL can be re-written as:

$$EL = WL + \dot{D_W} - iD_W - \left(h \left[W_u L - iD_W \right] + \left[1 - h \right] \left[WL + \dot{D_W} - iD_W \right] \right) \tag{26}$$

which represents the *aggregate employment rent with household debt*. Note that $\dot{D}_W = 0$ in the event of unemployment, consistent with the assumption that having jobs act as collateral for loans. If we now assume for simplicity that $W_u = 0$,[16] the expression in (26) simplifies to:

$$EL = h[WL + \dot{D_W}] \tag{27}$$

Normalizing by the capital stock and once again recalling that $\dot{D}_W/K = \dot{d}_W + g_K d_W =$

[15]Recall that, as previously explained, local variations in u are assumed to be absorbed by local variations in hours worked (rather than the unemployment rate). It is, then, strictly the binary distinction between having or not having a job (rather than variation in hours worked by those employed) that affects the capacity to borrow and hence the value of the employment rent in our analysis. In fact, variation in hours worked, and the tightness or slack in the labor market that this might appear to imply, has no effect on the value of the employment rent in our model.

[16]Recall that the transition from employment to unemployment is a credible threat not a physical state in this model. Hence setting the income associated with unemployment to zero does not mean that our debt dynamics are affected by default as a result of previously employed workers becoming unemployed (and earning no income), since no such transitions of state (from employment to unemployment) actually occur.

$f(d_W, \psi) + g_K d_W$ using equation (8), we obtain the *normalized aggregate employment rent with household debt*:

$$e = h[\psi u + f(d_W, \psi) + g_K d_W] \tag{28}$$

The expression in (28) is a measure of indebted workers' collective bargaining power. When there is an increase in e, so that the perceived cost of joss is higher, workers attach more value to retaining their current positions of employment. Consequently, they will be less willing to engage in behaviors that may result in job loss – such as bargaining for higher wages.

Bearing in mind the temporary equilibrium rates of capacity utilization and growth in (14) and (16), the expression for e in (28) sets up a complicated relationship between indebtedness, income distribution, and workers' aggregate employment rent. Hence:

$$\frac{\partial e}{\partial d_W} = h[\psi \frac{\partial u}{\partial d_W} + f_{d_W} + \frac{\partial g_K}{\partial d_W} d_W + g_K] \tag{29}$$

Note that if workers borrow more aggressively when they are more indebted ($f_{d_W} > 0$), we see $\frac{\partial u}{\partial d_W}, \frac{\partial g_K}{\partial d_W} > 0$ in equations (20) and (22). This will insure that an increase in workers indebtedness will increase the cost of job loss ($\frac{\partial e}{\partial d_W} > 0$). In this scenario, an increase in indebtedness induces more borrowing in order to debt-finance consumption spending. Because jobs are required for borrowing, this increases the value of employment to workers and hence the employment rent, resulting in a reduction of workers' bargaining power.

However, if workers are frugal, and reduce their borrowing as they become more indebted ($f_{d_W} < 0$), we may observe the opposite result. An increase in indebtedness increases debt servicing commitments which, by reducing after-interest-payments disposable income, has a negative effect on consumption. This reduces the value to workers of their jobs and lowers the employment rent. An increase in indebtedness, meanwhile, induces less borrowing to finance consumption, which also makes jobs less valuable and lowers the employment rent. And if workers reduce their debt-financed consumption aggressively, we may see $\frac{\partial u}{\partial d_W}, \frac{\partial g_K}{\partial d_W} < 0$ as

discussed at the end of section 2.4. In this case, an increase in workers' indebtedness will decrease the cost of job loss, resulting in an increase in workers' bargaining power.

Similarly, with regard to income distribution:

$$\frac{\partial e}{\partial \psi} = h[\psi + \psi \frac{\partial u}{\partial \psi} + f_\psi + \frac{\partial g_K}{\partial \psi} d_W] \tag{30}$$

If workers borrow more aggressively when they receive a higher real wage ($f_\psi > 0$), we see $\frac{\partial u}{\partial \psi}, \frac{\partial g_K}{\partial \psi} > 0$ in equations (17) and (19). This will insure that an increase in the wage share will increase the cost of job loss ($\frac{\partial e}{\partial \psi} > 0$). Intuitively, an increase in the real wage induces more borrowing to finance consumption. Both the increase in the real wage itself and the increase in borrowing, which is only possible when workers are employed, makes employment more valuable and so increases the employment rent. This will have a negative effect on workers' bargaining power.

However, if workers borrow less as they receive a higher wage ($f_\psi < 0$), the effect of a wage increase on e is ambiguous. A decrease in borrowing brought about by a wage increase makes employment less valuable, since borrowing to finance consumption is part of the value of a job. However, a real wage increase has a directly positive effect on the employment rent, since in and of itself a higher real wage makes a job more valuable. We therefore observe two opposing effects arising from the same increase in wages. If workers' seek to reduce their debt financed consumption aggressively, we may observe $\frac{\partial u}{\partial \psi}, \frac{\partial g_K}{\partial \psi} < 0$ as can be seen in equations (17) and (19). This will result in a decrease in the cost of job loss, raising workers' bargaining power. The notion that an increase in the real wage can *reduce* the employment rent (and so increase workers' bargaining power) is counterintuitive, since *ceteris paribus* a higher real wage undoubtedly makes jobs more valuable. But as the discussion above reveals, once we entertain the possibility of debt-financed consumption spending by workers, other things may not be equal. Indeed, with $f_\psi < 0$ and $|f_\psi|$ large, and with part of the value of a job deriving from the fact that jobs act as collateral for loans, it is possible that, on balance,

an increase in the real wage will decrease the value of holding a job and so reduce the size of the employment rent.

4 Dynamics

In this section, debt and distribution dynamics arising form the model outlined in the two previous sections are described. We then analyze the interaction of these dynamics and their implications for the steady state configurations of our model. We treat d_W and ψ as state variables. Equation (8) – repeated below for ease of reference – is thus relevant for our analysis in this section:

$$\dot{d}_W = f(d_W, \psi)$$

As previously discussed, the signs of the partial derivatives of (8) will differ depending on the precise borrowing behavior of workers.

We begin describing our distribution dynamics by writing:

$$\dot{\psi} = \varphi(e) \quad , \quad \varphi_e < 0 \tag{31}$$

Equation (31) is based on the logic of the employment rent: the higher is e, the less inclined are workers to engage in activity – such as bargaining for higher real wages and hence a higher wage share – that could be construed as conflictual and that could therefore result subsequently in job loss. Now recall from equation (28) that:

$$e = h(\psi u + f(d_W, \psi) + g_K d_W)$$

Combining this expression with (31) and recalling equations (14) and (16) (which show that both u and g_K are functions of ψ and d_W), we can write:

$$\dot{\psi} = \varphi(h[\psi u + f(d_W, \psi) + g_K d_W]) = \phi(d_W, \psi) \tag{32}$$

With $\varphi_e < 0$, the signs of ϕ_{d_W} and ϕ_ψ are ultimately determined by the signs of e_{d_W} and e_ψ which, as demonstrated in the previous section, can take on different values (positive or negative) depending on workers' borrowing behavior, as captured by the signs and magnitudes of the derivatives f_{d_W} and f_ψ.[17] This highlights the importance of households' borrowing behavior for the economy's macrodynamics, as will be elaborated further below.

4.1 Analyzing the Interaction of Debt and Distribution Dynamics

We now explore multiple possible scenarios arising from the debt and distribution dynamics summarized in the two-dimensional system of equations (8) and (32). Note that the Jacobian matrix of this system can be stated as:

$$\mathbf{J} = \begin{bmatrix} f_{d_W} & f_\psi \\ \phi_{d_W} & \phi_\psi \end{bmatrix} \tag{33}$$

where $Det(J) = f_{d_W}\phi_\psi - f_\psi\phi_{d_W}$ and $Tr(J) = f_{d_W} + \phi_\psi$.

Now note that from equation (8), it follows that:

$$d(\dot{d}_W) = f_{d_W}.d(d_W) + f_\psi.d\psi$$

By setting $d(\dot{d}_W) = 0$ to find the slope of the nullcline, this expression can be re-arranged to yield:

$$\frac{d\psi}{d(d_W)} = -\frac{f_{d_W}}{f_\psi} \tag{34}$$

Similarly, it follows from equation (32) (with $d\dot{\psi} = 0$) that the slope of the nullcline is given

[17] We assume that $\dot{d}_W$ and $\dot{\psi}$ are bounded and continuously differentiable functions that pass through the value of zero in the range of $d_W \in R^+$ and $\psi \in (0, 1)$.

as:

$$\frac{d\psi}{d(d_W)} = -\frac{\phi_{d_W}}{\phi_\psi} \tag{35}$$

Understanding the dynamics of the system becomes a question of determining the relative slopes of the nullclines, which is dictated by the partial derivatives that appear on the right hand sides of equations (34) and (35), bearing in mind the expressions for the determinant and trace of the Jacobian matrix in equation (33). As there could be different dynamic configurations around the steady state, three different cases are discussed here as behaviorally plausible examples of the dynamics that might arise form our model.

4.1.1 Case 1

First, recall that we can state that $f_\psi > 0 \Rightarrow e_\psi > 0$, and hence $\phi_\psi < 0$. If borrowing is increasing in the wage share ($f_\psi > 0$), because households are mindful of the need to generate sufficient wage income to service debt, the rate of change of the wage share is decreasing in the wage share ($\phi_\psi < 0$), because a higher wage share raises the value of the employment rent ($e_\psi > 0$) and so reduces the bargaining power of workers. Now recall also that $f_{d_W} > 0 \Rightarrow e_{d_W} > 0$, and hence $\phi_{d_W} < 0$. Borrowing increases in the level of indebtedness ($f_{d_W} > 0$) because more debt and hence more debt servicing creates the need to borrow more to finance consumption. Because a job is required for borrowing, this increases the value of employment and hence the value of the employment rent ($e_{d_W} > 0$). This will reduce workers' bargaining power and hence $\phi_{d_W} < 0$. We therefore have:

$$\frac{d\psi}{d(d_W)}\Big|_{\dot{d}_W=0} = -\frac{f_{d_W}}{f_\psi} < 0$$
$$\frac{d\psi}{d(d_W)}\Big|_{\dot{\psi}=0} = -\frac{\phi_{d_W}}{\phi_\psi} < 0$$

In this case, one possibility that arises is that:

$$\frac{d\psi}{d(d_W)}\Big|_{\dot{d}_W=0} > \frac{d\psi}{d(d_W)}\Big|_{\dot{\psi}=0}$$

$$\Rightarrow -\frac{f_{d_W}}{f_\psi} > -\frac{\phi_{d_W}}{\phi_\psi}$$

$$\Rightarrow f_{d_W}\phi_\psi - f_\psi\phi_{d_W} > 0 \tag{36}$$

This situation is depicted in Figure 1. The inequality in (36) indicates that $D(J) > 0$ in (33). Moreover, since $f_{d_W} > 0$ and $\phi_\psi < 0$, we will have $Tr(J) < 0$ in (33) as long as workers' positive borrowing response to their increased indebtedness is relatively weak ($f_{d_W} > 0$ is small – the relatively frugal case). In this case, the debt dynamics nullcline is flat relative to the wage share nullcline – as in Figure 1 – and the dynamic system summarized by equations (8) and (32) will be stable.

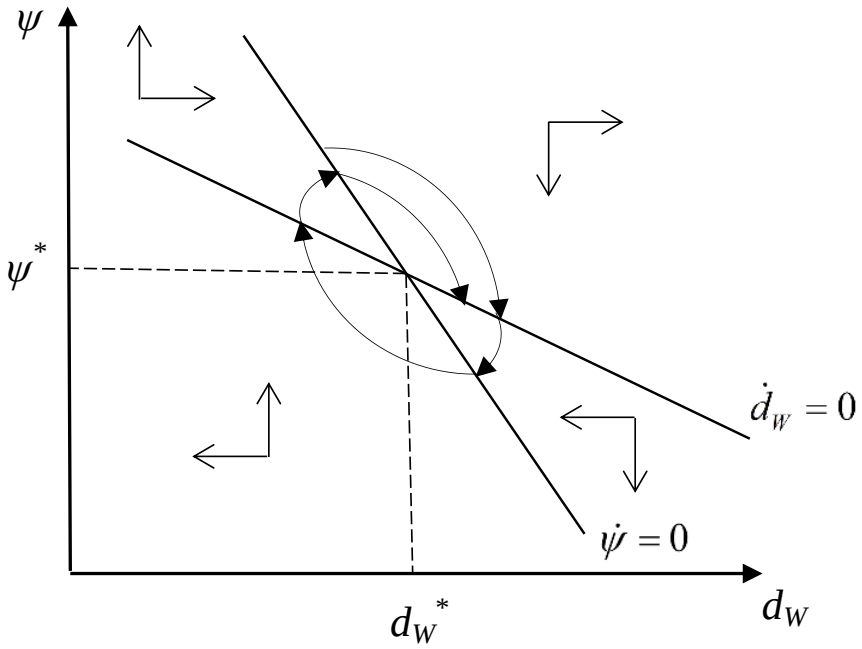

Figure 1: Stable Dynamics for Case 1

On the other hand, if $f_{d_W} > 0$ is large (the more conspicuous case), the system will be unstable. In this case:

$$\frac{d\psi}{d(d_W)}\Big|_{\dot{d}_W=0} < \frac{d\psi}{d(d_W)}\Big|_{\dot{\psi}=0}$$

$$\Rightarrow -\frac{f_{d_W}}{f_\psi} < -\frac{\phi_{d_W}}{\phi_\psi}$$

$$\Rightarrow f_{d_W}\phi_\psi - f_\psi\phi_{d_W} < 0 \tag{37}$$

so that with $Det(J) < 0$ in (33), the steady state of the system in equations (8) and (32) will be a saddle point and the system will be unstable off its saddle path. This situation is depicted in Figure 2, where the debt dynamics nullcline is now steeper than the wage share nullcline.

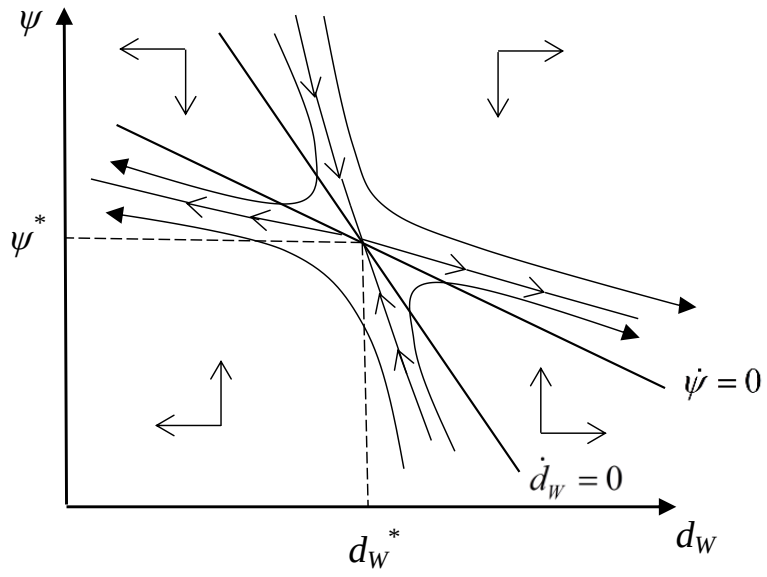

Figure 2: Unstable Dynamics for Case 1

4.1.2 Case 2

Next, consider the case in which, together with $f_\psi > 0$ and $\phi_\psi < 0$ as in case 1, worker households are so frugal as to aggressively reduce their debt-financed consumption whenever there is an increase in their indebtedness. In other words, $f_{d_W} < 0$ and $|f_{d_W}|$ is large. As discussed in section 3, this will result in $e_{d_W} < 0$ and hence $\phi_{d_W} > 0$. Intuitively, the decreased proclivity to borrow reduces the value of jobs (which are required in order to borrow and debt-finance consumption). And if this effect is sufficiently strong, it generates a reduction in the employment rent and so increases workers' bargaining power, with the final result that $\phi_{d_W} > 0$. We now have two positively sloped nullclines:

$$\frac{d\psi}{d(d_W)}\Big|_{\dot{d}_W=0} = -\frac{f_{d_W}}{f_\psi} > 0$$
$$\frac{d\psi}{d(d_W)}\Big|_{\dot{\psi}=0} = -\frac{\phi_{d_W}}{\phi_\psi} > 0$$

In this case, we have:

$$Tr(J) = f_{d_W} + \phi_\psi < 0$$

There are two possibilities for $Det(J)$, meanwhile. The first creates a stable system. When the debt dynamics nullcline has a steeper slope than the wage share dynamics nullcline because $|f_{d_W}|$ is large, so that $-\frac{f_{d_W}}{f_\psi} > -\frac{\phi_{d_W}}{\phi_\psi}$, we observe:

$$Det(J) = f_{d_W}\phi_\psi - f_\psi\phi_{d_W} > 0$$

However, it is also possible for the system to be only saddle-path stable as long as $|f_{d_W}|$ is not too large, so that $-\frac{f_{d_W}}{f_\psi} < -\frac{\phi_{d_W}}{\phi_\psi}$ and hence:

$$Det(J) = f_{d_W}\phi_\psi - f_\psi\phi_{d_W} < 0$$

Once again, we see that the magnitude (not just the sign) of workers' bargaining and borrowing responses to changes in indebtedness and the wage share has an important effect on the economy's macrodynamics. It is also worth noting that for any given $|f_{d_W}|$, the size of $|\phi_{d_W}|$ can become decisive in determining macro stability. In other words, the size of the *indirect* effect of f_{d_W}, working via the employment rent and hence the marginal effect of debt on the wage share, also exerts an important influence eon the economy's macrodynamics.

4.1.3 Case 3

Now consider the case where, together with $f_{d_W} > 0$ and $\phi_{d_W} < 0$, workers behave more frugally by reducing their borrowing and associated consumption whenever they experience a lower wage and wage share, so that $f_\psi < 0$. As discussed in section 3, as long as $|f_\psi|$ is not too large, this will result in $e_\psi > 0$ and hence $\phi_\psi < 0$. In other worlds, inequality and debt interact in a vicious circle. A rise in inequality increases borrowing and rising indebtedness increases inequality, generating a further increase in borrowing. Furthermore, rising indebtedness increases borrowing and indebtedness, which increases inequality and so induces additional borrowing. Clearly there are strong destabilizing behavioral mechanisms at work here, as a result of which the system is likely to exhibit unstable dynamics. More specifically, since:

$$Det(J) = f_{d_W}\phi_\psi - f_\psi\phi_{d_W} < 0$$

the steady state is a saddle point. In this case, we see $-\frac{f_{d_W}}{f_\psi} > -\frac{\phi_{d_W}}{\phi_\psi}$: the debt dynamics nullcline has a positive slope, whereas the wage share nullcline has a negative slope, as illustrated in figure 3.

However, this instability will disappear if workers reduce their borrowing and associated consumption aggressively when they experience higher levels of indebtedness. Hence suppose that $f_{d_W} < 0$ and $|f_{d_W}|$ is large so that $\phi_{d_W} > 0$, while we retain the assumptions that $f_\psi < 0$ and $\phi_\psi < 0$. We now have $-\frac{f_{d_W}}{f_\psi} < -\frac{\phi_{d_W}}{\phi_\psi}$: the debt dynamics nullcline has a negative slope, while the wage share nullcline has a positive slope, as in figure 4. In this scenario,

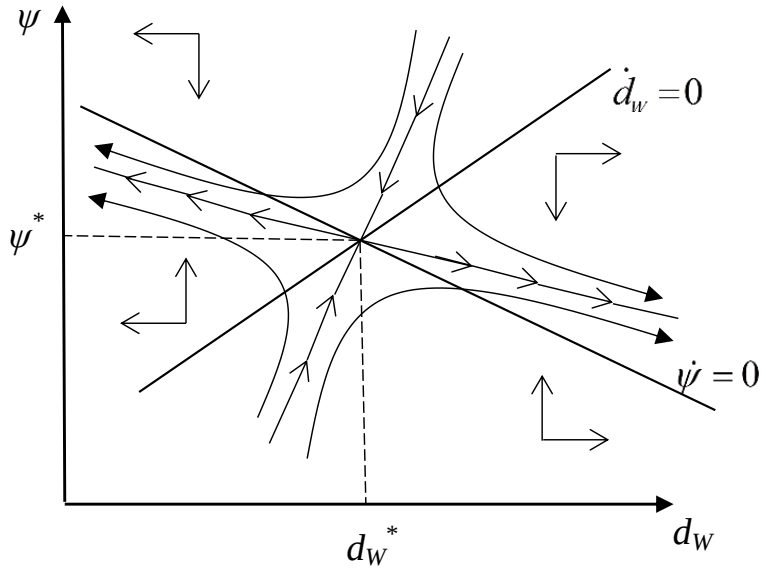

Figure 3: Unstable Dynamics for Case 3

rising inequality increases borrowing. But rising indebtedness reduces the employment rent, empowers workers, and ultimately reduces inequality. Furthermore, rising indebtedness will now reduce borrowing directly. We now observe strong stabilizing behavioral mechanisms, which inevitably gives rise to stable system dynamics since:

$$Det(J) = f_{d_W}\phi_\psi - f_\psi\phi_{d_W} > 0$$

and:

$$Tr(J) = f_{d_W} + \phi_\psi < 0$$

4.1.4 Summary

The various cases considered above are not exhaustive. Nevertheless, what is clearly established by and important to take away from the preceding discussion is that workers' borrowing behavior plays a decisive role in determining whether or not the economy is stable when there is a two-way interaction between household indebtedness and income inequality, such

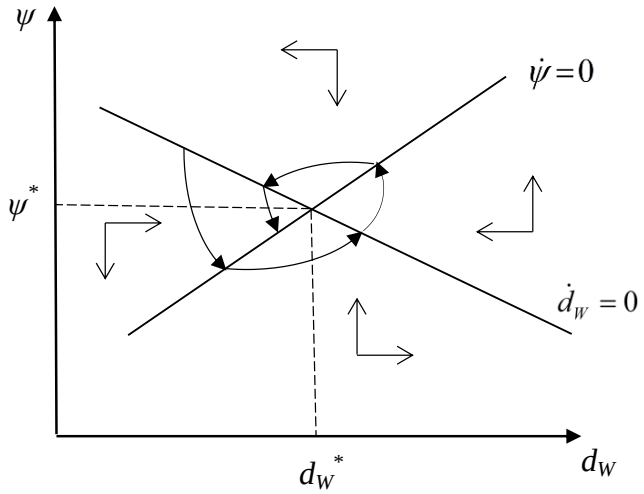

Figure 4: Stable Dynamics for Case 3

that borrowing and wage bargaining (as affected by the cost of job loss) are both endogenous to household debt and the wage share. This, in turn, draws attention to the importance for macro stability of financial norms and institutions, financial development, and policies that affect either (or both), at least insofar as they affect borrowing behavior (Cynamon and Fazzari, 2008; Kim et al., 2014; Setterfield and Kim, 2017).

5 Conclusion

If workers borrow to finance consumption spending and so experience rising debt burdens, their cost of job loss may rise if they need labor-market income to continue borrowing and servicing their debts. This will reduce their bargaining power and so increase income inequality, which may induce additional borrowing as workers strive to maintain consumption standards. The result is a vicious circle of rising inequality, job insecurity, and indebtedness – not unlike the experience of the last three decades in economies such as the US.

In this paper, we explicitly model the bi-directional relationship between household debt and income inequality by linking the latter (as causal variable) to the former (as effect) by

means of the Bowles-Schor employment rent framework. We have shown that the vicious circle interaction between indebtedness and inequality outlined above is possible, but that in fact the debt-inequality relationship is far from straightforward: the two-way interaction between these variables can have a variety of consequences for the macrodynamics of a growing economy. We are nevertheless able to establish three clear results that have important theoretical and policy implications. First, workers' borrowing and associated debt-financed consumption behavior plays an important role in determining the responsiveness of effective demand and growth to exogenous variations in income distribution, thus influencing the basic wage- or profit-led as well as debt-burdened or debt-led characters of effective demand and growth regimes. Second, household debt and workers' borrowing behavior play an important role in the labor market, affecting the cost of job loss and hence workers' bargaining power, and so exerting a second influence on macroeconomic dynamics via the (now endogenous) distribution of income. Finally, workers' borrowing behavior plays a crucial role in determining macroeconomic stability.

Our results are in keeping with the claims of Skott (2017, pp.343-53) that beyond a first approximation the distribution of income should not be treated as exogenous, and that labor market (as well as goods market) considerations must be factored into analyses of growth and distribution. They also lend further credence to the notion, increasingly common in Post-Keynesian macrodynamics, that for all the attention that has previously been paid to firms and their behavior (and in particular, the form of the investment function), the household sector now merits at least as much attention: with the widespread availability of consumer credit, consumption and household borrowing behavior may be at least as important as investment and corporate borrowing behavior for determining the basic characteristics of demand and growth regimes, and macroeconomic stability.

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